TITLE: NASA Space Life Sciences Training Program — Definition, Planning and Preparation Project

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NASA SPACE LIFE SCIENCES TRAINING PROGRAM DEFINITION, PLANNING AND PREPARATION PROJECT

Over several years, Ira Wolinsky, Ph.D., Department of Human Development, University of Houston, in consultation with appropriate NASA officials and managers, have worked for and advocated establishing a Space Life Sciences Training Program (SLSTP) at Johnson Space Center (JSC). This undergraduate training program would be similar to the successful program in place at Kennedy Space Center. Support for establishing a SLSTP at JSC had been expressed and forthcoming from administration at the universities involved, higher administration at the JSC Space and Life Sciences Directorate, and the divisions and branches within that Directorate. This evolving support came out of conversations, meetings and visits over the past several years. Establishing an SLSTP in Houston was deemed to be eminently feasible and desirable. The Houston SLSTP would be faithful to established objectives and hew to the basic outline of the established Kennedy Space Center SLSTP, but patterned to fit the unique educational opportunities and breadth of field of space life sciences available at JSC. The goal was to preserve, enhance and extend SLSTP's principles of superior undergraduate training in space life sciences and engineering to Houston, but at the same time, to be cognizant of the unique mission, orientation and operational constraints existing at JSC.

The basic objectives of a Houston SLSTP were defined:

- To contribute to developing leaders in space sciences and engineering by attracting bright, talented students to careers in the space program and NASA
- To introduce talented undergraduate college students to the space life sciences and the processes involved in conducting successful life sciences experiments on manned space flights
- To attract and retain women, ethnic minorities and other underrepresented groups to careers in the "hard sciences and engineering," emphasizing space life sciences
- To provide hands-on experience which clearly demonstrates the complex interactions and teamwork between scientists and engineers required to conduct successful space missions

The student body for the program would be undergraduates enrolled in U.S. colleges and universities, but could also be expanded to include high school and community college students and teachers, graduate students and international students, as demand arose.

It was proposed that the JSC SLSTP would start as a pilot project with 10 students from the greater Houston and Galveston areas. No housing, transportation or travel would be provided during this year since the students would commute from their homes to JSC. Experience with Year 01 would help us in a full-scale Year 02 with a complement of 36 students.

Details of our suggestions and recommendations for SLSTP implementation at JSC follow.

UNIVERSITY PARTICIPANTS

Student Trainees

During the first year, 10 students would be recruited and selected from universities and colleges in the greater Houston, Clear Lake City, and Galveston areas only. Insofar as possible, the selection guidelines developed for use of the Kennedy Space Center SLSTP program would be employed. There has been an SLSTP at KSC since 1985, and recruitment for this program has been ably performed by Florida A&M University. During Year 02, 36 students recruited nationally and selected by Florida A&M University would participate in the JSC SLSTP. Recruiting will be left largely in their hands, with the significant consultation, input and participation of a minority institution (historically Black college or university) working in partnership with the University of Houston. The establishment of a SLSTP in Texas would open a door to the West and its geographical position would enable better recruitment of Hispanic and Native Americans than has been hitherto possible. Each candidate accepted to SLSTP would either express his/her site preferences, or be appointed by a selection committee to the site where their interests and backgrounds best match. Concentration of recruiting/selection efforts in Florida A&M University's hands would keep down recruiting and selection expenditures, a "value added" bonus.

Counselors

Four project counselors (M.S. or Ph.D. level graduate students) would assist NASA JSC scientists on a daily basis in project planning and execution, and student supervision and guidance. These individuals would be selected from the pool of counselors generated by Florida A&M University. They would give lectures to students in their areas of expertise, provide trainee supervision, scientific guidance, mentoring for reports, workshops, and special projects. They would also assist PIs in program follow-up and evaluation, and provide non-academic counseling and leadership.

University of Houston — Main Campus

The nearness of the University of Houston to JSC and the surrounding contractor community contributes to its ease of interaction and cooperation. Its expertise in space-related sciences and technologies has enabled the University of Houston to earn a considerable number of NASA and space-related grants and contracts.

University of Houston — Clear Lake

This institution has demonstrated strengths in the natural and applied sciences and is dedicated to building strength in programs that support the region's various specialties, including technology and the medical and space sectors.

Historical Black College or University

Establishing a partnership with a minority institution would be most beneficial to building a program that intends to include a large component of qualified women and minorities. A minority university would have a permanent role in articulating with Florida A&M University in its recruitment and selection, curriculum development, and a career development program for SLSTP trainees finishing the training program. The minority institution would identify closely with the Houston program and develop programs additional to that undertaken by Florida A&M University.

One possibility identified for the minority university partner was Fisk University in Nashville, Tennessee. They expressed strong interest in participating in a

Houston-based SLSTP and worked with the University of Houston on some planning aspects.

Another possibility identified was Prairie View A&M University, a part of the Texas A&M University system and close to Houston. Positive interest in participation in a Houston-based SLSTP had been expressed by administrators in the Department of Applied Science and Engineering Technology, College of Engineering, and university administration.

Texas Southern University was also considered as a possible SLSTP partner. Of the three minority institutions considered, this university seemed the least viable.

CURRICULUM

Curriculum development would be a responsibility shared by all university and JSC partners, with a major role assumed by the University of Houston.

Lectures

A significant part of the students' training at JSC would be attending lectures given by JSC personnel, University of Houston faculty, scientists, managers, and astronauts. There exists a large pool of general science and space life sciences scientists in the Houston area to make this a rewarding experience for students. These lectures would provide a vehicle to teach the students introductory space sciences — content which is generally not available at typical universities. Such a course in space and life sciences could also be reinforced with lectures in experimental design or statistical analysis. Other topics supporting the space and life sciences could also be given (e.g., analytical software, astronomy, physics, chemistry, immunology, geology, nutrition, medical technology, biochemistry, lab safety, animal care). The program would call on appropriate JSC individuals to augment this didactic portion of the summer experience.

Tours

The inventory of tours available to a Houston SLSTP is impressive and include the following:

- JSC
  - Flight simulations
  - Water immersion training facility
  - Hypo and hyperbaric human-rated facilities
  - Space Center Houston
  - Moon Rock Laboratory
  - Mission Control Center
  - VIP tours
  - Others

- University of Houston at Clear Lake
  - Advanced Knowledge Transfer Lab
  - High Technologies Laboratory
  - Research Institute for Computing and Information Systems
  - Others

- University of Houston — Main Campus
  - Centralized animal care facilities
  - Sasakawa International Center for Space Architecture
  - Wake Shield Facility of the Space Vacuum Epitaxy Center
  - Texas Center for Superconductivity
  - Others

Workshops

Daytime or evening workshops on subjects reinforcing or supportive of the curriculum and career development of the SLSTP students would be scheduled and could include:

- Laboratory animal care and methodology
- Applying to medical school
- Applying to graduate school
- Women in science
- Stress management
- Career opportunities in the space program
- Total Quality Management
- Writing workshops
- Science ethics

Laboratory Work

The majority of the students' efforts would be devoted to hands-on research and laboratory projects. The students would work together in teams of nine each in the second year. The opportunities for hands-on, short-term research projects for talented, well-motivated undergraduates at JSC is vast and includes at least five divisions in two Directorates:

- Space and Life Sciences Directorate
  - Life Sciences Project Division
  - Flight Crew Support Division
  - Medical Services Division
  - Solar System Exploration Division

- Engineering Directorate
  - EC/Crew and Thermal Systems

Students would be involved in all components of suitable, on-going research viz: conception, design, execution, analysis and dissemination. A forum would be provided for presentation of interim research results and final results.

The above suggestions and recommendations were submitted to the SLSTP Project Manager and other NASA personnel and their input sought. Consultations, planning, linkage-building, and explorations of strategies to implement a JSC SLSTP continued.